



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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MEMORANDUM

TO: State Water Control Board Members

FROM: Jutta Schneider, Water Planning Division Director

SUBJECT: Final Adoption of Water Quality Standards Regulation Amendments
(9 VAC 25-260) – Section 155: Freshwater Ammonia Criteria

DATE: November 20, 2018

EXECUTIVE SUMMARY

Staff will ask the Board to adopt proposed amendments to the Virginia Water Quality Standards Regulation, 9 VAC 25-260-155, specifically freshwater ammonia criteria for the protection of aquatic life. This recommendation is based on:

- Review of final EPA criteria recommendations issued in 2013 and technical support information,
- Comments received on the proposed amendments during two public review/hearing periods (Sept. 18 – Dec. 8, 2017, and Aug. 6 - Oct. 5, 2018),
- Input received from a Regulatory Advisory Panel over the course of this rulemaking (member listing provided in Attachment 1), and
- A Virginia Code mandate enacted by the 2018 General Assembly requiring that the Board include in such adoption a Phased Implementation Program (PIP) consistent with the federal Clean Water Act.

BACKGROUND

The water quality standards are the cornerstone for water quality protection and restoration programs at DEQ. For example, these standards are used to set pollution limits in discharge permits and evaluate the quality of surface waters statewide. Water quality standards define the goals for healthy waters by designating their uses, setting water quality conditions that will protect those uses and establishing anti-degradation provisions to safeguard high quality waters. They protect water quality so rivers, lakes and other waterbodies can be sources of water supplies; support recreational, agricultural, and industrial activities, among others; promote the growth of fish and shellfish that are suitable for human consumption; and, protect aquatic life and water-dependent wildlife.

Both the Clean Water Act and State Water Control Law require that the Board review Virginia's water quality standards every three years for the purposes of revising and updating to reflect changes in law, technology and scientific information. The goal is to provide the citizens of the Commonwealth with a

technical regulation that is protective of water quality in surface waters, incorporates recent scientific information, reflects agency procedures and is reasonable and practical.

Consideration of amendments to the freshwater ammonia criteria began under the most recent Triennial Review that was started in 2013, along with numerous other revisions for parameters including manganese, copper, several waterbody reclassifications, bacteria, cadmium, and 94 human health criteria. The Board previously approved amendments for these other parameters at their meetings on 1/14/16 and 8/21/18. The ammonia criteria amendments were separated from the original Triennial Review with the Board's approval on 1/14/16 (along with bacteria, cadmium and 94 human health criteria) to allow additional time to consider and address significant public comments received or more recent criteria recommendations from the Environmental Protection Agency. A second deferral on the ammonia criteria was approved by the Board at their 8/21/18 meeting to allow DEQ to incorporate the General Assembly's mandate that a Phased Implementation Program accompany the adoption of the amended criteria. The full text of the proposed technical amendments to the freshwater ammonia criteria is provided in Attachment 2. The full text of the proposed Phased Implementation Program is provided in Attachment 3.

SUBSTANCE OF PROPOSED AMENDMENTS

In August 2013, the Environmental Protection Agency (EPA) published updated nationally recommended freshwater ammonia criteria for the protection of aquatic life. Like the current criteria, the proposed criteria are calculated as a function of temperature and pH and account for the presence or absence of trout and early life stages of fish. In general, the toxic effects of ammonia on aquatic life become more pronounced with increasing pH and temperature.

Based on the most recent scientific studies, the recalculated ammonia criteria now incorporate toxicity data for freshwater mussels and snails, which are the most sensitive organisms in the recalculation data base. The new criteria are about twice as stringent as the existing criteria primarily because more recent toxicity data show that mussels and snails (including endangered species) are very sensitive to ammonia and the current ammonia criteria do not provide sufficient protection for these species. Site specific options to calculate criteria omitting mussel toxicity data are proposed to be used in waters where a demonstration has been made that mussels are absent; however, consultation with U.S. Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries indicate freshwater mussels should be considered ubiquitous in Virginia and likely to be present in any perennial waterbody.

Table 1. EPA's 2013 Final Freshwater Aquatic Life Criteria for Ammonia

CRITERIA* (Assumed pH = 7.0; T = 20°C)	CONCENTRATION (mg/L total ammonia nitrogen)
Acute (1-hour average)	17
Chronic (30-day rolling average)	1.9**

* **Criteria Frequency:** Not to be exceeded more than once in 3 years on average.

** Not to exceed 2.5 times the chronic concentration as a **4-day average** within 30 days.

Compared to the current criteria, which were based on EPA recommendations issued in 1999, at pH 7 and 20°C the 2013 acute criterion magnitude is 1.4-fold lower than the current acute criterion. At this pH and temperature, the 2013 chronic criterion magnitude is 2.4-fold lower than the current chronic

criterion. The decreases in criteria magnitudes reflect the inclusion of the new toxicity data discussed above.

Public Comment and DEQ Response

A. During the **first public review period**, which closed December 8, 2017, the following comments were received on the proposed ammonia criteria amendments:

1. Commenter: Chesapeake Bay Foundation; expressed support for the proposed revisions with a 10-year compliance schedule for facilities that cannot meet permit limits; did not support allowing schedules to extend beyond this period.

DEQ's Response: *Acknowledge CBF's support for the proposed revisions.*

2. Commenter: U.S. Environmental Protection Agency; stated that DEQ should ensure the proposal is consistent with recommendations regarding duration and frequency of exceedance, specifying that the 4-day average of ammonia concentration (not to exceed 2.5 times the chronic criterion in a 30-day period) be included in the proposal.

DEQ's Response: *DEQ acknowledges the EPA 2013 recommendation for the 4-day average chronic criterion, but did not originally include this criterion in the proposed amendments. At that time, DEQ was relying on EPA's 1999 implementation guidance which provided for the allowance that a 30Q10 design flow when calculating steady state waste load allocations for dischargers should also be as protective as 2.5 times any 4-day average (Federal Register, FRL-6513-6 December 22, 1999-Implementation Guidance). "30Q10" means the lowest flow in the receiving stream, averaged over a period of 30 consecutive days that can be statistically expected to occur once every 10 climatic years. This factor was adopted into the Board's 2001 rulemaking (approved by EPA) for the ammonia criteria as footnote "6" to Section 140.B. EPA's guidance for the 2013 criteria is silent on this matter; therefore, DEQ assumed that the current wording in the Water Quality Standards Regulation was still valid and sufficient. EPA has since pointed out that the provision for use of the 30Q10 is in the implementation section of the 1999 guidance, not in the actual criteria recommendations. The proposed inclusion now of the 4-day average criterion is addressed in the Comment/Response section below, related to the most recent public comment period (Aug. 6 - Oct. 5, 2018).*

3. Commenters: Amherst Co. Service Authority (S.A.), August Co. S.A., Bath Co. S.A., Town of Culpeper, Frederick Water, City of Fredericksburg, Goochland Co. Dept. of Public Utilities, Halifax Co. S.A., Hampton Roads Sanitation District, Hanover Co., Harrisonburg-Rockingham Regional S.A., Henry Co. Public S.A., Town of Hillsville, Hopewell Water Renewal, Lee Co. Public S.A., Loudoun Water, Louisa Co. Water Authority, City of Norton, Pepper's Ferry Regional Wastewater Treatment Authority, Rapidan S.A., City of Richmond, Town of Tappahannock, Tazewell Co. Public S.A., Upper Occoquan S.A., Virginia Coal and Energy Alliance, Inc., Virginia Association of Municipal Wastewater Agencies, Virginia Manufacturers Association, Virginia Rural Water Association, Virginia Water and Waste Authorities Association, Warm Spring Sanitation Commission, Wise Co. Board of Supervisors, Wythe Co. Public S.A.

Commenters expressed concern over the increased costs they predict will be incurred by permitted facilities due to the adoption of the updated ammonia criteria that may result in more

stringent discharge permit limits. They requested that DEQ consider a long-term phased implementation plan that works in conjunction with the implementation of other nitrogen-based requirements (e.g., Chesapeake Bay TMDL), with assistance provided through the Water Quality Improvement Fund. Commenters also requested that DEQ make specific allowances for permit limits (e.g., the use of a 50th percentile pH value rather than 90th percentile pH value). Some commenters also request a delay in the adoption of the new criteria to allow for more refined planning.

DEQ's Response: *The agency realizes there is potential for economic impacts to treatment facilities. This issue is addressed in the Comment/Response section below, related to the most recent public comment period (Aug. 6 - Oct. 5, 2018).*

- B. During the **second public review period**, which closed October 5, 2018, the following comments were received on the proposed ammonia criteria amendments. DEQ received 47 sets of comments from local governments, wastewater authorities, industrial dischargers, associations and representative organizations, one environmental group, one citizen, and the EPA (see Attachment 4 for the full list of commenters). Most of the localities, Service Authorities, and Public Utilities operating municipal sewage treatment works provided very similar comments based upon recommendations developed by the Virginia Association of Municipal Wastewater Agencies (VAMWA) and were submitted using virtually the same format.

1. Shared Comments:

- a. The risk of financial hardship is extreme, particularly for small municipal wastewater systems, including many serving rural areas of the Commonwealth. Most of the commenters reference costs calculated by an engineering firm retained by VAMWA. Those cost estimates (in 2014 dollars) are \$512 million in capital costs plus recurring annual operation and maintenance costs of \$34 million as their best estimate of this impact on Virginia localities, wastewater authorities and utility ratepayers.

DEQ's Response: *DEQ acknowledges the potential fiscal impact on dischargers not currently controlling ammonia in their discharge and accepted the VAMWA cost estimates as representative. It was for this reason the original criteria amendments were proposed to include provisions for extended compliance schedules (beyond the term of a permit) based on demonstrated need to give time to secure necessary funding, plan, design and construct needed retrofits and cost-effectively address multi-purpose projects. This "strawman" language has now been replaced with the provisions for the Phased Implementation Program enacted by the 2018 General Assembly.*

- b. Agree with the goal of providing appropriate protection for snails and mussels (the most sensitive species used in ammonia toxicity calculations) but believe spending on additional protection for those species should be considered in the context of the broader public interest including important societal needs, rather than mandating it, which forces snail and mussel protection as a priority over discretionary public spending. Costs for compliance with the more stringent criteria may result in unmet legitimate environmental and non-environmental public needs such as schools and other locality infrastructure due to limited financial resources.

DEQ's Response: *Both the federal Clean Water Act and Virginia's State Water Control Law mandate protection of designated uses, including aquatic life. This mandate is not given in the context of considering all other possible public interests and societal needs, but inclusion of the PIP in the ammonia criteria amendments is intended to lessen the impact on affected dischargers while achieving the requirement to protect aquatic life.*

- c. Most of the commenters provided information on their wastewater systems. Three of the localities are currently in various stages of progress to upgrade Combined Sewer Overflow (CSO) systems (Cities of Alexandria, Lynchburg, and Richmond) and they state that considerable financial resources have been, and continue to be spent, to ensure those projects are completed.

DEQ's Response – *DEQ acknowledges the efforts made by permitted facilities to control discharge of pollutants of all types to Virginia's waters.*

- d. The majority of commenters recommended that DEQ include the Phased Implementation Plan (PIP) in the regulation with the added extension of 6 months for each facility tier. This would change the proposed 6, 18 and 30 months for Tiers 1, 2, and 3 respectively to 12, 24 and 36 months. It is also suggested that the design flow for the first tier of facilities should be changed from 1.0 MGD and greater design capacity (DEQ's proposal) to 5.0 MGD and greater capacity. They state owners of facilities greater than 5.0 MGD would likely be in a better situation to understand and prepare for the application process, whereas owners of facilities below 5.0 MGD (smaller localities or authorities) will require more DEQ outreach, assistance and lead time to prepare preliminary engineering analyses and the information required in those analyses, and in determining the appropriate criteria compliance schedules. Similarly, the second tier should be increased from 0.1 MGD to 0.5 MGD, and the third tier from less than 0.1 MGD to less than 0.5 MGD.

DEQ's Response – *The ammonia criteria amendments that will be recommended to the State Water Control Board for adoption include the PIP. In response to the comments received, staff has proposed changes to the classes of permittees outlined in Part G.1 and extended the effective dates of the criteria by 6 months for each of the three tiers.*

- e. Urge DEQ to use all available implementation procedures and practices to minimize the impacts on wastewater facilities, including procedures from other states that have been previously approved by EPA and other recommendations by VAMWA that are not prohibited by federal statute or regulation and reduce layers of conservatism in the permitting process.

DEQ's Response – *DEQ is evaluating the factors and assumptions used in deriving ammonia permit limits and will make changes that can be reasonably accommodated and scientifically justified in order to provide additional relief to permittees. These changes will not be included in the Water Quality Standards Regulation, but will be addressed in agency permitting guidance with an opportunity for input from interested stakeholders.*

- 2. Commenter: Town of Keysville; stated that compliance with more stringent ammonia criteria is too expensive and they cannot afford to do any plant improvements to increase ammonia

removal. They understand the intent of the proposed regulation; however, the increased cost to already struggling budgets to small utilities such as theirs is neither fair nor feasible.

DEQ's Response - *The proposed amendments provide the option of utilizing compliance schedules specific to ammonia that can extend longer than 5 years. Language was developed with input from Regulatory Advisory Panel participants to amend section 9VAC25-260-155 (ammonia criteria) to address permit compliance schedules for ammonia limits to allow for the time necessary to secure financial resources for facility upgrades needed for those facilities to be compliant with newer, more stringent discharge limits. Any additional modification to permitting practices for determination of discharge limits for ammonia would be addressed through permitting guidance. On the issue of potential financial stress caused by implementing the revised ammonia criteria, the 2018 General Assembly revised the eligibility provisions of the Water Quality Improvement Fund to specifically identify "cost effective technologies to reduce loads of...nitrogen-containing ammonia" to the list of project types eligible for grant funding. Further, DEQ's Clean Water Revolving Loan Fund Program makes available low interest loans for plant retrofits, sometimes with zero-interest (and on occasion "principal forgiveness") in cases of severe fiscal stress on the recipient.*

3. Commenter: VA Manufacturers Association; stated that the factors for demonstrating the need for an extended compliance schedule do not adequately account for industrial dischargers. DEQ should include a specific process for industrial dischargers to assert and receive protection against the public disclosure of confidential business information. The time frame for issuing permits incorporating the new criteria (as water quality-based effluent limits) is too inflexible. Request that DEQ revise 9 VAC 25-260-155.G.3.a, to add the following factor ("v"): "For industrial dischargers, the technological or economic practicability of complying with the ammonia criteria, based on industry or facility-specific information".

DEQ's Response - *DEQ acknowledges that the language included in State Code and the proposed Regulation applies more directly to municipal facilities. DEQ has modified Parts G.3.a.i., G.3.b.ii, and G.3.b.iv to clarify that these provisions are also available to industrial discharges.*

The intent of the proposed PIP is that it be applicable to all VPDES permits issued pursuant to 9VAC25-31, Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation. While both major and minor industrial facilities are referenced in the PIP, DEQ agrees that some clarifying revisions (underlined below) should be made to the proposal to better accommodate industrial dischargers.

- *Item 3.a.i. will now read: "The relative priority of ammonia criteria and other water quality and water infrastructure needs of the local community or permittee". (This change could cover any non-municipal treatment plant, such as industrials, privately-owned treatment works, or commercial facilities).*
- *Item 3.b.iii. will now read: "An assessment of projected affordability and identification of all potential sources of funding for enhanced ammonia treatment. In the case of publicly owned treatment works, include an evaluation of the required sewer use fee versus median household income".*

Under provisions of the state statute governing Freedom of Information, DEQ cannot give assurance that confidential business information provided by an industrial applicant for the PIP will be protected against public disclosure. While the State Water Control Law (§62.1-44.21. Information to be furnished to Board) and VPDES Permit Regulation (9VAC25-31-80 and -860. Confidentiality of Information) appear to provide some protection for “secret formulae, processes, or methods” claimed as confidential, DEQ is unsure this would apply to the PIP, as “Information required by VPDES application forms provided by the department may not be claimed confidential”. Therefore, it is recommended that this type of information should not be included with the application.

In response to the comments received, to provide more flexibility in the time frame for issuing permits incorporating the new criteria, staff has proposed changes to the classes of permittees outlined in Part G.1 and extended the effective dates of the criteria by 6 months for each of the three tiers. The phased effective date schedule in Part G.1 applies to permits being reissued and does not prompt permit modifications to incorporate the new ammonia water quality criteria. Staff has not added VMA’s proposed paragraph G.3.a.v., as it extends authority beyond that identified in the state code.

4. Commenter: Appalachian Power Co.; APCo uses ammonia and related chemical compounds in various water treatment and air pollution control capacities. The list of components of an extended compliance schedule demonstration in proposed language 9VAC25-260-155.G.3.b may not be inclusive of all potential components of such a demonstration. Requests that the language in 9VAC25-260-155-G.3.b.ii and iv be modified to provide flexibility to permittees for whom source reduction may be the most favorable strategy and provide time to select the appropriate alternative compliance mechanism.

DEQ’s Response - *The intent of the proposed phased implementation plan is that it be applicable to all VPDES permits issued pursuant to 9VAC25-31, Virginia Pollutant Discharge Elimination System (VPDES) Permit Regulation. Staff has proposed changes to 9VAC25-260-155.G.3.b.ii and iv to recognize source reduction alternatives for industries.*

5. Commenter: U.S. Environmental Protection Agency; Consider using a different term in the compliance schedule context or, at a minimum, clarify: (1) what the term “highest achievable condition (HAC)” means with respect to compliance schedules; and, (2) that its use here does not imply that an applicant for a compliance schedule is also applying for, or obtaining, a water quality standards variance. Work with EPA so they may understand what the state intends with this proposal and to identify options to achieve the state’s intended outcome. The compliance schedule language in the PIP is not subject to EPA water quality standards review under Clean Water Act Section 303(c); however, they constitute NPDES program revisions subject to EPA review under Section 402.

DEQ’s Response - *Proposed section 9VAC25-260-155.G.3.b(v) states: “An evaluation, prepared by a professional engineer registered in Virginia, of the **highest achievable condition (HAC) regarding nitrification capabilities of the current treatment facility design** under the influent loading conditions expected during the term of the VPDES permit and the design loading conditions.” DEQ believes it is apparent the term “highest achievable condition” refers to*

wastewater within the facility and subsequent quality of effluent and not the highest achievable condition of instream water quality of the receiving stream.

EPA has been a participant in the Regulatory Advisory Panel during the development of this Phased Implementation Program and throughout the promulgation of ammonia criteria amendments and DEQ will continue to work with, and seek input from EPA as this issue progresses.

DEQ acknowledges EPA's finding that the PIP language is not subject to WQS review under CWA Section 303(c), but will be subject to EPA review as an element of Virginia's VPDES Permit Program under CWA Section 402.

*Regarding EPA's prior comment (dated 11/6/17; submitted during the first public review period) on inclusion of the **4-day average chronic criterion**, DEQ has revised the proposal to add the following text. This appears before each section for derivation of the chronic criteria, covering the three possible combinations for mussels and early life stages present or absent: "In addition, the 4-day average concentration of total ammonia nitrogen (in mg N/L) shall not exceed 2.5 times the chronic criterion within a 30-day period, more than once every three years on the average."*

While inclusion of the 4-day average chronic criterion is a change since the amendments were proposed for public comment, research done by DEQ staff indicate that it is not a significant change in terms of impact on permitted dischargers or potential for additional assessments of state waters as "impaired" due to failure to meet the criterion. Regarding the potential impact on permitted dischargers, in accordance with EPA's guidance, if the ammonia chronic criteria are implemented using the 30Q10 stream flow, then no further conditions are necessary. Implementation of the 30-day chronic criteria at 30Q10 is protective of the 4-day average chronic criteria; therefore, no additional impact on VPDES permittees is anticipated due to inclusion of the 4-day average criteria in the proposal.

The results from a statistical analysis of ambient monitoring data strongly suggests that in the majority of free-flowing streams in the Commonwealth, attainment of the 4-day average ammonia criterion can be presumed when the 30-day average criterion is met. Site-specific variability of ammonia was determined from datasets spanning multiple years generated in 20 streams across the state. Using the variability determined for each stream, 200 simulated annual datasets were created. These datasets were then used to estimate the likelihood that a given waterbody would exceed the 4-day average criterion while meeting the 30-day average criterion. This analysis found that the variability of ammonia in 75% of the examined waterbodies is so low that there is a negligible risk of the 4-day mean criterion being exceeded when the 30-day mean criterion is met. The statewide percentage is likely much higher than 75%, since the streams that were selected for this analysis had been targeted for intensive monitoring because upstream sources elevate their risk of experiencing degraded water quality.

6. Commenter: Chesapeake Bay Foundation; Recommend language be included to define a specific number of permit cycles and suggest that the limit be two 5-year permit cycles or an applicable TMDL deadline for the tributary to which the facility discharges, whichever is earliest. Expand

grant funding to include low interest financing programs such as Virginia's Clean Water Revolving Loan Program. Explore opportunities to incentivize additional total nitrogen reductions, which may coincide with upgrades needed for achieving ammonia criteria but are not required.

DEQ's Response - *The controlling requirement for the schedule under the PIP will be that "compliance shall be achieved as soon as possible in accordance with 9 VAC 25-31-250.A.1".*

Regarding grant funding, DEQ cannot unilaterally expand availability because of dependence on General Assembly appropriations to the Water Quality Improvement Fund (WQIF) and any restrictions put on the use of those funds in budget language. However, the 2018 General Assembly revised the eligibility provisions of the WQIF to specifically identify "cost effective technologies to reduce loads of...nitrogen-containing ammonia" to the list of project types eligible for grant funding. Further, DEQ's Clean Water Revolving Loan Fund Program does make available low interest loans for plant retrofits, sometimes with zero-interest (and on occasion "principal forgiveness") in cases of severe fiscal stress on the recipient.

DEQ acknowledges the recommendation to explore additional incentives for nitrogen reductions to coincide with upgrades needed to achieve ammonia criteria. As stated above, any financial incentives are dependent on General Assembly appropriations to the WQIF or other funds and any restrictions put on the use of those funds in budget language.

ATTORNEY GENERAL'S CERTIFICATION

The Office of the Attorney General has been asked to review the proposed amendments and certify the Board's authority to adopt them. If certification is received before the Board meeting, this will be reported.

STAFF RECOMMENDATION

Staff recommends the Board adopt the proposed amendments to the freshwater ammonia criteria for the protection of aquatic life, 9 VAC 25-260-155, as presented.

PRESENTER CONTACT INFORMATION:

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ATTACHMENTS

Attachment 1: Regulatory Advisory Panel Membership

Attachment 2: Virginia Water Quality Standards (9 VAC 25-260-155), full text of proposed technical amendments to the freshwater ammonia criteria

Attachment 3: Virginia Water Quality Standards (9 VAC 25-260-155), full text of proposed Phased Implementation Program to accompany the freshwater ammonia criteria

Attachment 4: Listing of commenters responding during the second public review period, that closed October 5, 2018

Memo to the SWCB – Approval of Amendments to the Freshwater Ammonia WQ Criteria

Jutta Schneider

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Attachment 5: Department of Planning and Budget's Economic Impact Statement (6/16/17); section on ammonia criteria begins on page 2

Attachment 6: Final Regulation Agency Background Document